Solving One Step Equations Involving Rational Numbers

Let's work through examples of solving one step equations with rational numbers.

1. Solve $\frac{4}{5} = y - \frac{2}{3}$.

This equation has subtraction with the variable. We will perform addition to solve this equation. I will start by rewriting the equation. We will add $\frac{2}{3}$ to each side. On the left side we'll have $\frac{4}{5} + \frac{2}{3}$, and on the right-hand side we'll have $y - \frac{2}{3} + \frac{2}{3}$. On the left side we will have to add $\frac{4}{5} + \frac{2}{3}$. The multiples of 5 are 5, 10, 15, 20, and the multiples of 3 are 3, 6, 9, 12, 15. The common multiple is 15, so the common denominator will be 15. $\frac{4}{5}$ becomes $\frac{12}{15}$, and $\frac{2}{3}$ becomes $\frac{10}{15}$. $\frac{12}{15} + \frac{10}{15} = \frac{22}{15}$. On the left side we have $\frac{22}{15}$. $-\frac{2}{3} + \frac{2}{3}$ would be 0, so we have $y - 0$. Which would reduce to just y. Our solution is $\frac{22}{15} = y$.

To check our work we will substitute $\frac{22}{15}$ in for y in the original equation. Now I substitute. $\frac{4}{5} = \frac{22}{15} - \frac{2}{3}$. $\frac{2}{3}$ with a denominator of 15 would be $\frac{10}{15}$. $\frac{22}{15} - \frac{10}{15}$ would be $\frac{12}{15}$. To reduce $\frac{12}{15}$ we can divide the numerator and the denominator by 3. 12 divided by 3 would be 4 and 15 divided by 3 would be 5. $\frac{4}{5} = \frac{4}{5}$.

2. Solve $5.1 = \frac{h}{6.5}$.

This equation has division on the same side of the equal sign as the variable. This means we will use the inverse operation, multiplication, to solve. We will multiply each side of the equation by 6.5. On the left side we would have 5.1×6.5 and on the right side we have $\frac{h}{6.5} \times 6.5$. On the left hand side, 5.1×6.5 would be 33.15. On the right side 6.5 goes over a 1. We multiply across and get $\frac{6.5h}{6.5}$. 6.5 over 6.5 would reduce to 1, so we have $1h$, which is just h. $\frac{33}{15} = h$ is our solution.

To check our work we will substitute 33.15 in for h in the original equation. $5.1 = \frac{33.15}{6.5}$. $33.15 \div 6.5 = 5.1$. We reach $5.1 = 5.1$ so our work is correct.

3. Solve $-3.2x = 25.6$.

We will divide each side of the equation by -3.2. When simplifying on the left, $\frac{-3.2}{-3.2}$, becomes 1. So we are left with x. On the right side, 25.6 divided by -3.2 is -8. Our solution is $x = -8$.

To check our work we will substitute -8 for x in the original equation. $-3.2(-8) = 25.6$. -3.2 times -8 is positive 25.6. $25.6 = 25.6$. Our work is correct.

Together we have worked through examples of solving one step equations involving rational numbers. Refer to this video if you need help when working on these types of problems.